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CLMPTO

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15. A process for the production of refinery transportation fuel or blending components for refinery transportation fuel, which process comprises:

partitioning by distillation an organic feedstock comprising a mixture of organic compounds derived from natural petroleum, the mixture consisting essentially of material boiling between about 73° C. and about 425° C. to provide at least one low-boiling organic part consisting of a sulfur-lean, mono-aromatic-rich fraction, and a high-boiling organic part consisting of a sulfur-rich, mono-aromatic-lean fraction;

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contacting a gaseous source of dioxygen with at least a portion of the low-boiling organic part in a liquid reaction medium containing a soluble catalyst system comprising a source of at least one catalyst metal selected from the group consisting of manganese, cobalt, nickel, chromium, vanadium, molybdenum, tungsten, tin, cerium, or mixture thereof, while maintaining the liquid reaction medium substantially free of halogen and/or halogen-containing compounds, to form a mixture of immiscible phases comprising hydrocarbons, oxygenated organic compounds, water of reaction, and acidic co-products;

separating from the mixture of immiscible phases at least a first organic liquid of low density comprising hydrocarbons, oxygenated organic compounds and acidic co-products and second liquid of high density which contains at least portions of the catalyst metal, water of reaction and acidic co-products; and

contacting all or a portion of the separated organic liquid with a neutralizing agent and recovering a low-boiling oxygenated product having a low content of acidic co-products; and

contacting the high-boiling organic part with an immiscible phase comprising at least one organic peracid or precursors of organic peracid in a liquid reaction mixture maintained substantially free of catalytic active metals and/or active metal-containing compounds and under conditions suitable for oxidation of one or more of the sulfur-containing and/or nitrogen-containing organic compounds;

separating at least a portion of the immiscible peracid-containing phase from the oxidized phase of the reaction mixture; and

contacting the oxidized phase of the reaction mixture with a solid sorbent, an ion exchange resin, and/or a suitable immiscible liquid containing a solvent or a soluble basic chemical compound, to obtain a high-boiling product containing less sulfur and/or less nitrogen than the high-boiling part.

16. The process according to claim 15 wherein the immiscible phase is formed by admixing a source of hydrogen

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peroxide and/or alkylhydroperoxide, an aliphatic monocarboxylic acid of 2 to about 6 carbon atoms, and water.

17. The process according to claim 15 wherein the immiscible phase is formed by admixing hydrogen peroxide, acetic acid, and water.

18. The process according to claim 15 wherein at least a portion of the separated peracid-containing phase is recycled to the reaction mixture.

19. The process according to claim 15 further comprising blending at least a portion of the low-boiling oxygenated product with at least a portion of the high-boiling product to obtain components for refinery blending of transportation fuel.

20. The process according to claim 15 wherein the oxidation feedstock is a high-boiling distillate fraction consisting essentially of material boiling between about 200° C. and about 425° C. derived from hydrotreating of a refinery stream.